DOCUMENT RESUME

ED 304 339 SE 050 422

AUTHOR Stiff, Lee V.
TITLE Sharing Successful Mathematics Programs Across the Southeast. A Catalog of Successful Math Programs Across Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina.
INSTITUTION Southeastern Educational Improvement Lab., Research Triangle Park, NC.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE Nov 88
CONTRACT 400-86-0007
NOTE 24p.
PUB TYPE Reference Materials - Directories/Catalogs (132) -- Reports - Descriptive (141)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Advanced Placement Programs; Demonstration Programs; *Elementary School Mathematics; Elementary Secondary Education; *Mathematical Concepts; Mathematical Enrichment; *Mathematics Achievement; *Mathematics Curriculum; Mathematics Education; *Mathematics Materials; Remedial Programs; *Secondary School Mathematics; Special Programs

ABSTRACT

This catalog describes 38 successful mathematics education programs in six states. In each program the site, content focus, grade level, program description, and address for contact are provided. Summary tables are organized by content focus; grade level; and by achievement level of students targeted by programs including special, remedial, average, and advanced. (YP)

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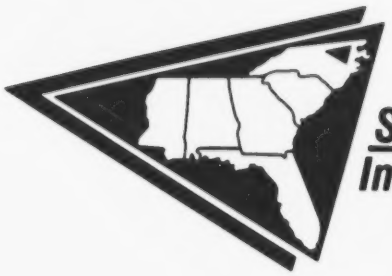

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This publication is based on work sponsored wholly, or in part, by the Office of Educational Research and Improvement of the United States Department of Education, under Contract Number 400-86-0007. The content of this publication does not necessarily reflect the views of the Office of Educational Research and Improvement, the Department, or any other agency of the U.S. Government.

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A Catalog of Successful Math Programs Across Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina

Prepared for the Southeastern Educational Improvement Laboratory by:
Lee V. Stiff
Department of Mathematics and Science Education
North Carolina State University
Raleigh, North Carolina

November 1988

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Introduction

The Southeastern Educational Improvement Laboratory (SEIL) has developed this catalog to identify successful mathematics education programs in the six states that it serves: Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina. The catalog describes mathematics education programs that have been developed and/or implemented in response to local needs.

The programs were selected by members of the SEIL Regional Mathematics Improvement Program Committee and approved and submitted by the local education agency program director. These classroom programs were selected because nominators have deemed them to be successful in assisting practitioners in their efforts to improve classroom instruction and enhance student performance. Lab staff and the regional mathematics committee members hope that this catalog will serve as a useful resource guide to state mathematics consultants, local mathematics supervisors, and K-12 mathematics teachers.

Programs at the elementary, middle, and secondary levels of education that serve students at the remedial, developmental, and advanced levels of instruction have been identified. The following three pages contain indices of the programs by content focus, grade levels of implementation, and achievement levels of students for which the programs are designed.

This catalog was developed under the direction of Frederick E. Smith, Southeastern Educational Improvement Laboratory (SEIL), and the members of the SEIL Regional Mathematics Improvement Program Committee: Pamela Brannen, Citizens and Southern Corporation, Atlanta, Georgia; Marjorie Claytor, South Carolina Department of Education; Leo Edwards, Jr., Mathematics and Science Education Center, Fayetteville State University; Carolyn Hecker, Cocoa Beach, Florida; Robert Jones, North Carolina Department of Public Instruction; Donna Lander, Mississippi Department of Education; Robert Lumsden, Florida Department of Education; Marlene McClerklin, Columbia, South Carolina; Phyllis P. Martin, Georgia Department of Education; Anthony Morris, Batesville, Mississippi; Linda Pledger, Alabama Department of Education; Andy Reeves, Florida Department of Education; and Eleanor Smithers, Huntsville, Alabama.

For additional information about these programs, contact the director of the program in question or Frederick Smith, SEIL, P.O. Box 12748, 200 Park, Suite 200, Research Triangle Park, NC 27709-2748; (919) 549-8216 or 1-800-237-4829 (outside North Carolina).

Summary: Content Focus

Content Focus	Project Numbers
Early Childhood Mathematics	3, 7, 9, 11, 12, 18, 23, 25, 35
Arithmetic	6, 7, 9, 11, 12, 15, 16, 18, 24, 25, 35
7th-Grade Mathematics	6, 10, 13, 16, 18, 20, 24, 25, 37
8th-Grade Mathematics	2, 6,10, 13, 16, 18, 20, 24, 25, 37
Enrichment Topics/Problem Solving	10, 13, 15, 18
Consumer Mathematics	6, 18, 19
General Mathematics	8, 14, 17, 18, 19, 26, 30, 36
Algebra I	4, 5, 6, 13, 18, 21, 22, 24, 27, 30, 31, 37
Geometry	1, 4, 5, 6, 18, 21, 22, 30, 31, 32, 34, 37
Algebra II	4, 6, 18, 21, 30, 31, 37
Advanced Mathematics	4, 6, 18, 21, 28, 30, 31
Trigonometry	6, 18, 21, 30, 31
Calculus	4, 18, 21, 30, 33
Other	15, 16, 18, 27, 29, 30, 31, 32, 36, 38

Summary: Grade Levels

Grade Levels	Project Numbers
Kindergarten	3, 9, 11, 18, 29, 35
Grade 1	3, 7, 9, 11, 12, 18, 29, 35
Grade 2	3, 7, 9, 11, 12, 18, 23, 29, 34, 35
Grade 3	7, 9, 11, 12, 18, 23, 25, 29, 34, 35
Grade 4	7, 9, 11, 12, 15, 18, 23, 25, 29, 34, 35
Grade 5	7, 9, 11, 12, 15, 18, 25, 29, 34, 35
Grade 6	7, 9, 11, 15, 16, 18, 24, 25, 29, 34, 35
Grade 7	5, 6, 10, 13, 15, 16, 18, 19, 20, 24, 25, 29, 37, 38
Grade 8	2, 5, 6, 10, 13, 15, 16, 18, 19, 20, 21, 24, 25, 29, 37, 38
Grade 9	6, 8, 10, 14, 15, 17, 18, 19, 21, 22, 24, 29, 30, 32, 36, 37, 38
Grade 10	4, 6, 8, 14, 17, 18, 19, 21, 22, 26, 27, 29, 30, 32, 36, 37, 38
Grade 11	1, 4, 6, 14, 17, 18, 19, 21, 26, 27, 28, 29, 30, 31, 32, 37, 38
Grade 12	1, 4, 6, 14, 17, 18, 19, 21, 26, 27, 28, 29, 30, 31, 32, 33, 37, 38
Other	15, 18

Summary: Achievement Levels

Achievement Levels of Students Targeted by Programs	Project Numbers
Special Education	11, 18, 19, 35
Remedial	3, 8, 9, 12, 14, 15, 16, 17, 18, 19, 20, 23, 25, 26, 29, 30, 34, 35, 36
Average	2, 3, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 32, 34, 35, 37
Advanced	1, 2, 3, 4, 5, 6, 9,10, 12, 15, 16, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 35, 37

Alabama

1. Fifth-Year Math Program

SITE: Enterprise High School, Enterprise, Alabama

CONTENT FOCUS: Analytic Geometry

GRADE LEVEL: 11-12

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: The activities of the ***Fifth-Year Math Program*** are designed to aid students in making a successful transition from algebra and trigonometry to calculus. One semester is devoted to analytic geometry. A second semester includes a variety of mathematical topics, including set theory, statistics, probability, limits, derivatives, functions, proofs by induction, series, sequences, binomial theorem, and groups. Included within the Fifth-Year Math Program is BASIC programming for mathematical use, mathematical research (a technical paper), and a visual project. Class presentations also are required.

Students actively participate in mathematics at an advanced instructional level. Their evaluations of what they have learned consistently have been positive. Most importantly, students develop a positive attitude toward higher mathematics.

The instructional design of the program includes lectures, demonstrations, cooperative learning, computer lab, library research, and the use of media materials.

Special training or experiences needed by participating teachers include training in computer science, experience teaching trigonometry and calculus, and familiarity with research topics in mathematics relating to instruction at the secondary level.

The following student outcomes are emphasized and used to judge the effectiveness of the program: improved attitudes toward mathematics, increased achievement in school mathematics courses, and increased enrollment in advanced mathematics classes.

Funding is provided by local, state, and federal sources.

Student progress is monitored by teacher-made tests, performance on research projects, computer programming achievements, class participation, and project grades.

CONTACT: Wanda Motes
Enterprise High School
Rt. 1, Box 162
Jack, AL 36346
(205) 894-2328

2. Math Counts Competition

SITE: Marshall Middle School, Evergreen, Alabama

CONTENT FOCUS: 8th-Grade Honors Mathematics

GRADE LEVEL: 8

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: ***Math Counts*** is a national mathematics competition for middle-years students that encourages participation in the study of mathematics. It recognizes the importance of mathematics in science and engineering careers. Problem solving is a special emphasis of the program.

Participating teachers should have at least five years of teaching experience and experience coaching math teams. Students meet daily for one hour to prepare for the competitions.

The instructional design of the program includes lectures, demonstrations, and cooperative learning.

Student outcomes include: improved attitudes toward mathematics; increased math achievement levels; improved performance during math competitions; and increased enrollment in high school math courses. In addition, the program promotes community and parental involvement in mathematics instruction and enhances the teacher's knowledge of mathematics concepts.

Funding is provided from local schools funds.

Student progress is monitored by the results of skill and power drills, contests, and achievement tests.

CONTACT: Pat Cassady
Marshall Middle School
107 Finch Avenue
Evergreen, AL 36401
(205) 578-3262

3. Mathematics Their Way

SITE: Selma Public Schools, Selma, Alabama

CONTENT FOCUS: Early Childhood Mathematics

GRADE LEVEL: K-2

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Mathematics Their Way*** is an activity-centered program for grades K-2, that allows children to view mathematics as a way of thinking. Activities are designed to help children develop an understanding and an insight into patterns of mathematics.

The program allows students to learn math concepts through the manipulation of real-life materials and to progress gradually from hands-on experience levels to more abstract levels. Students develop thinking skills as they explore materials, build and search for patterns, sort, classify, compare, and solve problems. Skills in number operations are built simultaneously, not in isolated sequences.

In the program, students: 1) use hands-on materials at all levels, 2) focus on relationships and process before focusing on the solution to problems or symbolization in mathematical terms, (3) work with others on different ability levels, and (4) generate their own problems and think through solutions to these problems.

This program creates a classroom environment that enhances self-concept and social interaction. The teacher becomes a facilitator of learning, fulfilling the goal of teaching children to think.

Due to the complexity of the program, special instructional training is required. A variety of materials, both commercial and teacher-made, is needed for implementation.

The effectiveness of the program is reflected in improved attitudes (students and teacher) toward mathematics as well as increased student achievement in mathematics.

Funding is provided from local, state, and federal sources.

Student progress is monitored by evaluation instruments that accompany the program.

CONTACT: Edna Anderson
Selma Public Schools
P.O. Box F
Selma, AL 36702-0318
(205) 874-1607

4. *Math Seminar*

SITE: Grissom High School, Huntsville, Alabama

CONTENT FOCUS: Algebra, Geometry, Advanced Math, and Calculus

GRADE LEVEL: 10-12

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: *Math Seminar* offers students an opportunity to progress beyond standard high school mathematics topics and standard ways of exploring these topics. The program places a special emphasis on problem solving with speed and accuracy. Students and teachers share the responsibility of providing instruction.

Teachers need an excellent grasp of mathematical concepts to successfully implement programmatic activities. Students meet daily and are required to complete activities outside of the classroom.

Verbally expressing mathematical concepts is an important element of the seminar. Students are encouraged to interact with each other and with teachers to maximize their understanding of mathematics and the problem-solving process.

The instructional design of the program includes teacher lectures, student lectures, and group activities in and outside of the classroom (such as participating in local and regional math competitions).

The effectiveness of the program is reflected in improved student attitudes toward mathematics; improved classroom performance in mathematics; increased abilities to communicate mathematical ideas and approaches to problems more effectively; and increased community and parent involvement in mathematics instruction.

Funding is provided locally.

Student achievement is monitored by performance in math competitions.

Several of the competitions in which the students participate include: math league contests, local high school and university math tournaments, a statewide math contest, and Mu Alpha Theta national convention contests.

CONTACT: Dorothy Wendt
Grissom High School
10201 Melanie Drive
Huntsville, AL 35802
(205) 883-7042

5. *Seventh-Grade Algebra*

SITE: Mountain Brook Junior High, Birmingham, Alabama

CONTENT FOCUS: Algebra I and Geometry

GRADE LEVEL: 7-8

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: *Seventh-Grade Algebra* is an accelerated mathematics program designed to provide students with an understanding of algebra and introduce them to several geometric concepts. In the demanding program, students meet daily in regular class sessions and are assigned homework daily. They also are involved in activities relating to career options associated with the study of mathematics. The instructional design of the program includes lectures, demonstrations, cooperative learning experiences, and laboratory experiences. Participating teachers need a

strong background in mathematics and are expected to possess a high enthusiasm for teaching mathematics.

The effectiveness of instruction is judged by students' positive attitudes toward mathematics, their achievements (emphasis is on test performance), and their heightened career awareness. The program encourages parental involvement.

Local school funds provide support.

Student progress is monitored by student performance on the Orleans-Hanna Algebra Prognosis Pretest, Lankford Algebra Competency Posttest, and Orleans Hanna Geometry Prognosis Posttest.

CONTACT: Kay Balch
Mountain Brook Junior High
205 Overbrook Road
Birmingham, AL 35213
(205) 871-3516

6. Walker County Academic Tournament

SITE: Walker County Schools, Jasper, Alabama

CONTENT FOCUS: Arithmetic, Algebra, Geometry, Trigonometry, Consumer/Business Mathematics, and Senior Mathematics

GRADE LEVEL: 7-12

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: The ***Walker County Academic Tournament*** provides mathematics students with an opportunity to demonstrate their knowledge of mathematical concepts. Students meet daily to prepare for the tournament and are required to complete assignments outside of the classroom before they are selected to represent the school.

The program places heavy emphasis on solving problems, improving attitudes toward mathematics, increasing participation in mathematics, and improving thinking skills. The program also promotes parental involvement in mathematics instruction.

Instructional strategies that have been used successfully in this program include lectures, demonstrations, cooperative learning experiences, and laboratory experiences.

Student benefits are reflected in their improved performance during tournament competition, improved attitudes toward mathematics, improved achievement, increased enrollment in mathematics classes, and increased recognition from community organizations.

Participating teachers increase their awareness of their academic strengths and weaknesses and become sensitive toward problems students face in learning mathematics.

Funding is provided from local school funds, Walker College, and the University of Alabama.

Student progress is monitored by teacher-made tests.

CONTACT: Genette Meeks
Walker County Schools
Route 7, Box 410
Jasper, AL
(205) 384-3718

7. Writing To Relieve Math Anxiety

SITE: Mary B. Austin Elementary School, Mobile, Alabama

CONTENT FOCUS: Elementary School Mathematics

GRADE LEVEL: 1-6

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: ***Writing to Relieve Math Anxiety*** is a program designed to use writing activities to improve elementary students' attitudes toward mathematics and to assist them in achieving a better understanding of mathematical concepts and algorithms. The length and frequency of writing activities are determined by the teacher and are related to the instructional needs of the students. Students are encouraged to devote time to the learning activities outside of the classroom environment.

The instructional design of the program emphasizes demonstrations and cooperative learning through writing. Effective use of this instructional strategy by teachers is enhanced by their participation in staff development sessions focusing on various approaches to using writing in teaching mathematics.

Student outcomes used to judge the effectiveness of the program include improved attitudes toward mathematics and increased achievement in mathematics. Residual effects of the program include: increased teacher competence in teaching mathematics, heightened teacher awareness of and sensitivity toward student problems, and increased recognition from community and state organizations.

Funding is provided by the state.

Student progress is monitored by chapter and unit tests.

CONTACT: Terry E. Beasley
Mary B. Austin Elementary School
150 Provident Lane
Mobile, AL 36608
(205) 342-4018

Florida

8. Calculator-Assisted Mathematics for Everyday Living (CAMEL)

SITE: Daytona Beach, Florida

CONTENT FOCUS: General Mathematics

GRADE LEVEL: 9-10

ACHIEVEMENT LEVELS of Students: Remedial and Average

PROGRAM DESCRIPTION: *CAMEL* is a program designed to promote effective use of calculators in solving mathematical problems. Program activities focus on understanding mathematical concepts, not on the mechanics used in problem solving. Emphasis is placed on calculator application skills associated with mathematical concepts in high school general mathematics. Instructional items needed include calculators, CAMEL materials (including computational modules, pretests, and posttests), and a data management system.

Individualized instructional approaches are recommended for maximum program effectiveness. A one-day staff development session on individualizing instruction is recommended for participating teachers.

The program has been successful in improving students' attitudes toward mathematics, increasing student achievement in mathematics, and increasing students' appreciation for and understanding of how to effectively use technology to solve everyday mathematical problems.

Funding is provided by local and federal sources.

Student progress is monitored by CAMEL pretests and posttests.

CONTACT: NEFEC
P.O. Box 198
Boswick, FL 32007
(904) 328-8811

9. Effective Teaching of Mathematics

SITE: Lee County Public Schools, Ft. Myers, Florida

CONTENT FOCUS: Elementary School Mathematics

GRADE LEVEL: K-5

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Effective Teaching of Mathematics*** is a program that emphasizes traditional mathematics instructional approaches. The program uses the direct-instruction or whole-class instructional method. Students meet daily and are assigned activities to complete outside of class.

Instructional strategies used in the program include lectures, class demonstrations, and use of hands-on activities. Participating teachers are encouraged to receive training in the use of the Good and Grouws' Active Mathematics Teaching Model.

The effectiveness of the program is measured by an improvement in students' attitudes toward mathematics and an increase in their achievement levels in school mathematics courses.

Participating teachers' knowledge of instructional strategies for teaching mathematics is enhanced through use of the approaches advocated in the Good and Grouws teaching model.

Funding is provided locally.

Student progress is monitored by a computer data management system, Florida Statewide Assessment Tests (Grades 3 and 5), and the California Achievement Test (Grades 1-5).

CONTACT: Bob Curry
Elementary Mathematics Supervisor
Lee County Public Schools
2055 Central Avenue
Ft. Myers, FL 33901
(813) 334-1102

10. QUEST

SITE: Sandalwood Junior-Senior High School, Jacksonville, Florida

CONTENT FOCUS: Enrichment Topics for Junior High School

GRADE LEVEL: 7-9

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: *QUEST* challenges the mathematical abilities of junior high students beyond the normal expectations of the regular classroom. Students participate in math seminars and are exposed to higher order mathematical concepts. Quest emphasizes the use of higher level concepts that often are not found in junior high mathematics textbooks. The seminars provide opportunities for students to think creatively and investigate mathematical relationships.

Students participate in seminar activities twice a week and are not expected to complete activities outside of class. Program activities use manipulatives and computers with graphics capabilities to help students explore mathematical relationships.

Teachers use mathematical games, manipulatives, and computers to achieve program objectives.

Teachers' interest in the program is the main prerequisite for being involved in this program. However, experience in teaching mathematics and computer science is useful. Teachers spend approximately six hours per week instructing and preparing for class. Approximately six hours per week are needed to develop materials for use in the program.

Quest has been judged a success because students' attitudes toward mathematics and mathematics achievement levels have improved.

There are no special funding requirements.

Student progress is monitored by the Stanford Achievement Test.

CONTACT: Marita H. Eng
Sandalwood Junior-Senior High School
2750 John Prom Blvd.
Jacksonville, FL 32217
(904) 646-5100

11. Research Exchange for Computerized Individualized Programs of Education (RECIPE)

SITE: Project RECIPE, Sarasota, Florida

CONTENT FOCUS: Basic Skills Areas in Elementary Mathematics

GRADE LEVEL: K-6

ACHIEVEMENT LEVELS of Students: Learning Disabled

PROGRAM DESCRIPTION: *RECIPE* is an instructional management system designed to provide individualized programs of instruction. Students meet daily and use RECIPE materials, including activity books, audiotapes, planning materials, and microcomputers.

The data management system tracks individualized instructional programs, activity books, audiotapes, and computer-assisted instructional designs for participating students and teachers.

Special training for participating teachers includes a two-day in-service training session on the use of the microcomputer management system.

The success of the program is judged by students' improved attitudes toward mathematics and performance in mathematics courses.

Teachers report that the individualized system makes them conscious of and sensitive to students' learning problems. Parental involvement has been observed, and the program has received recognition from community, state, and national agencies.

Funding is provided locally.

Student progress is monitored by tests developed by the RECIPE project developers.

CONTACT: Sanders Bell
Chapter 1 Grants
The School Board of Sarasota County
2418 Hatton Street
Sarasota, FL 34237
(813) 957-3899

12. Superstars II

SITE: Florida Department of Education, Tallahassee, Florida

CONTENT FOCUS: Higher-Order Mathematics Skills, Grades 1-5

GRADE LEVEL: 1-5

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Superstars II*** challenges the higher order thinking skills of elementary children. Teachers frequently overlook or neglect inclusion of these skills in favor of instruction focused on the basic skills typically taught in elementary math classes. The primary emphasis of the program is on problem solving and higher order thinking.

The program uses materials prepared by Florida Department of Education. Teachers determine effective strategies for implementing the program. Students meet a minimum of once a week and they are expected to spend about one to two hours per week on program activities outside of class.

This program supplements normal instruction. The instructional approach highlights student initiative. Students work extra problems on their own with help from the teacher, the teacher assistant, or school volunteer. As rewards for the extra work, they earn stars. These stars are displayed in the school. Solutions to problems are rated by difficulty, and students earn from one to four stars for each solution. Students may use calculators.

Participating teachers receive training in a three-day workshop on current approaches to problem-solving strategies.

The effectiveness of the program is reflected in students' improved higher level thinking skills, their increased willingness to work mathematical problems, and increased parent and community involvement in mathematics activities.

Support for the program is provided from state funds.

Student progress is not formally monitored. Informally, parents give the program high marks.

CONTACT: Andy Reeves
Knott Bldg.
Florida Department of Education
Tallahassee, FL 32303
(904) 488-1701

13. *University of Chicago School Mathematics Project*

SITE: Pinellas County Schools Largo, Florida

CONTENT FOCUS: 7-8 Mathematics, Including Algebra

GRADE LEVEL: 7-8

ACHIEVEMENT LEVELS of Students: Average

PROGRAM DESCRIPTION: The ***University of Chicago School Mathematics Project*** advocates the need to reshape the K-12 mathematics curriculum. In Largo, Florida, curriculum materials have been used to evaluate the effectiveness of this new approach to mathematics instruction. The project emphasizes reading, using calculators and computers, performing applications, and exploring new topics such as statistics and discrete mathematics. The program generally assumes that students are capable of achieving more in mathematics if additional attention is given to the scope and sequence of the concepts taught.

Students meet daily in classes and are expected to spend typical amounts of time doing homework.

Standard instructional methods are used in the program. Participating teachers are expected to have a strong mathematics background.

Improvements in students' attitudes toward mathematics and achievement in mathematics courses and increased enrollments in mathematics classes and use of technology represent the dimensions on which the success of the program is gauged.

Teachers are able to increase their understanding of other mathematical concepts, such as statistics and discrete mathematics.

Funding is provided by AMOCO Foundation, National Science Foundation, General Electric, and the Carnegie Foundation.

Student progress is monitored by the Orleans-Hanna Algebra Readiness Test, a local high school test of general mathematics skills, and other tests developed by project developers.

CONTACT: Margaret Hackworth
Supervisor of Secondary Mathematics
Pinellas County Schools
205 Fourth Street S.W.
Largo, FL 34640
(813) 585-9951

Georgia

14. *Mathematics Laboratory for Noncollege-bound Students*

SITE: Coffee High School, Douglas, Georgia

CONTENT FOCUS: General or Basic Mathematics

GRADE LEVEL: 9-12

ACHIEVEMENT LEVELS of Students: Remedial and Average

PROGRAM DESCRIPTION: ***Mathematics Laboratory for Noncollege-Bound Students*** emphasizes the following: incorporating hands-on activities, using technology, improving attitudes toward mathematics, and increasing enrollment in mathematics classes. Manipulatives enhance the teaching of mathematical concepts and skills.

Students participate in program activities daily. Twenty-five percent of the regular class time is spent in a laboratory setting.

The instructional laboratory provides unique experiences for participating students. The instructional design centers around hands-on activities and computer use. Teachers who have experience providing remedial math instruction and understand instructional computing are most prepared to work in this program.

Indicators of success of program activities include positive student attitudes toward mathematics and increased attendance in mathematics classes.

Funding is provided locally.

CONTACT: Terri Stevens or Sue Hutchinson
Coffee High School
P.O. Box 979
Douglas, GA 31533
(912) 384-2094

15. *Problem-Solving and Thinking Project*

SITE: Georgia State University, Atlanta, Georgia

CONTENT FOCUS: Middle School Mathematics Problem Solving

GRADE LEVEL: 4-9

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: The ***Problem-Solving and Thinking Project***—a 10-week program—helps teachers identify and develop metacognitive skills as they engage in problem-solving activities. The use of video cameras and video cassette recorders allows teachers to evaluate themselves participating in problem-solving activities.

A system of ongoing modeling, experimenting, and reflecting characterizes this program. Emphasis is given to creating models of the problem-solving process. As an integral part of the project, program participants are required to provide instruction to other middle school mathematics teachers.

The program has been judged effective. Teachers are confident when handling problem-solving experiences in schools. They indicate that the benefits of the program include teachers' increased competence in mathematical instruction and their increased awareness of and sensitivity toward students' problems in learning mathematics.

Funding is provided by the National Science Foundation.

Student progress in not formally monitored.

CONTACT: Karen Schultz or Lynn Hart
Georgia State University
Curriculum and Instruction
University Plaza
Atlanta, GA 30303
(404) 651-2511

16. Project Link

SITE: Radium Springs Middle School; Merry Acres Middle School, Albany, Georgia

CONTENT FOCUS: 6-8 Mathematics and Science

GRADE LEVEL: 6-8

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Project Link*** helps middle school students understand relationships between mathematics and other sciences. Program activities integrate concepts in math and science and involve students in problem-solving activities.

Inexpensive teacher- and student-made teaching materials are used in the program. Some commercially produced materials, such as rods, measurement materials, paper, compasses, and rulers, are required.

Teachers are expected to participate in special in-service training on effective instructional strategies for using manipulatives, creating student-centered activities, and using applied projects.

The program's instructional design stresses hands-on activities. Student-activity centers and teacher lectures are other instructional features.

Program goals are to improve student attitudes toward mathematics, increase achievement in mathematics and science courses, and increase enrollment in math and science classes.

Teachers benefit from their training on effective use of manipulatives in teaching mathematics. As a result of their participation, teachers become sensitive to student learning difficulties in mathematics and science.

Funding is provided by local and state sources.

Student progress is monitored by standardized mathematics and science tests.

CONTACT: Mary Kendall, Beverley Shoemaker, or Virginia Monroe
Dougherty County School System
P.O. Box 1470
Albany, GA 31703
(912) 431-1249

17. Remedial Education Program

SITE: DeKalb County Schools, Decatur, Georgia

CONTENT FOCUS: Remedial Mathematics

GRADE LEVEL: 9-12

ACHIEVEMENT LEVELS of Students: Remedial

PROGRAM DESCRIPTION: ***Remedial Education Program*** emphasizes moving remedial students from below grade level to grade level in mathematics while ensuring that they master mathematical concepts as they progress. Special training is given to participating teachers. They attend a training workshop provided by the department of secondary education of the DeKalb County Schools.

Students meet daily and are expected to complete homework activities regularly. There are no other formal program-related activities outside of class; however, some teachers practice innovative and creative techniques of teaching that allow students to conduct surveys, prepare and perform role-playing activities, and use an integrated subject approach to problem solving. For example, students may use newspapers to complete an assignment that could

satisfy requirements in English, social studies, and mathematics classes.

The instructional design of the program includes individualized instruction based on the student's previous academic performance and standardized test results. Most classes are taught in a mathematics laboratory equipped with two computers. EDL program materials and other supplementary materials and equipment, such as newspapers and computers, are used.

This program, recognized by community and state organizations, has created positive student attitudes toward mathematics, increased achievement in mathematics courses, and decreased enrollment in remedial math classes.

Funding is provided by local and state sources.

Student progress is evaluated by the Test of Achievement and Proficiency (TAP) and the Georgia Basic Skills Test (GBST).

CONTACT: Marva J. Fears
DeKalb County Schools
3770 North Decatur Road
Decatur, GA 30032
(404) 297-1274

18. Systematic Teaching and Measuring Mathematics (STAMM)

SITE: Oconee County Schools, Watkinsville, Georgia

CONTENT FOCUS: An Objectives-Based Curriculum Derived From 11 Comprehensive Mathematics Strands for K-12, Special Education, Chapter I, and Gifted and Talented.

GRADE LEVEL: K-12

ACHIEVEMENT LEVELS of Students: Remedial, Average, Advanced, and Special Education

PROGRAM DESCRIPTION: ***Systematic Teaching and Measuring Mathematics,*** a comprehensive approach to K-12 mathematics, addresses the needs of students receiving instruction at the remedial, developmental, and advanced levels. The program emphasizes effective management systems that include objectives, pretests, posttests, student data files, and documentation of program effectiveness. Supplemental resources for probability and statistics and vocational applied mathematics (VAM) are included also.

The instructional design of the program is characterized by its flexibility in accommodating different learning and teaching styles. Participating teachers attend a two-day STAMM training workshop provided by the project STAMM staff.

The success of the STAMM project is judged by students' improved attitudes toward mathematics, increased achievement levels in mathematics courses, improved performance on standardized exams and state mathematics exams, and increased enrollment in math classes.

The flexibility of the program offers teachers an opportunity to participate actively in improving instructional techniques in mathematics. Teachers become aware of and sensitive toward student problems in learning mathematics.

Local, state, and federal funds support the project. Student progress is monitored by standardized math tests, state developed math tests, and teacher-made tests.

CONTACT: Frances Hensley
607 Aderhold Hall
University of Georgia
Athens, GA 30602
(404) 542-3332

19. Vocational Applied Mathematics (VAM)

SITE: Oconee County Schools, Watkinsville, Georgia

CONTENT FOCUS: Basic Math Skills Related to 21 Different Vocational Programs

GRADE LEVEL: 7-12

ACHIEVEMENT LEVELS of Students: Remedial, Average, Advanced, and Special Education

PROGRAM DESCRIPTION: ***Vocational Applied Mathematics*** (VAM) uniquely applies solutions to mathematical problems found in vocational studies. The program uses a management system that emphasizes reviewing, remediating, and applying basic mathematics skills in vocational programs. The program may be implemented daily in a unit of study during a short period of time or in a weekly schedule during an extended period of time.

The use of diagnostic-prescriptive techniques makes it possible to tailor instruction for the individual student or for small or large groups. The program is flexible in accommodating different teaching styles.

The program is designed to improve students' attitudes toward mathematics and help them understand that achievement in mathematics is tied to success in vocational areas. Enrollment in classes has increased, also.

Funding is provided by local, state, and federal money earmarked for vocational, academic, or special education.

Student progress is monitored by teacher-made tests.

CONTACT: Ed Ward, Director
Vocational Instruction Unit
1766 Twin Towers East
Atlanta, GA 30334-5040
(404) 656-2552

Mississippi

20. 7th-and 8th-Grade Math

SITE: Grenada Junior High School, Grenada, Mississippi

CONTENT FOCUS: Middle-Years Mathematics

GRADE LEVEL: 7-8

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Seventh- and 8th-Grade Math,*** designed to prepare students for future study in higher level mathematics, centers around the instructional needs of students. The program emphasizes problem solving, standardized test taking skills, hands-on activities, and instructional computing. Special student advising is a unique component of this program.

Lectures, demonstrations, computer tutorials (for reinforcement only) and individualized instruction are used in this program. Participating teachers should be certified to teach middle years mathematics.

Improved attitudes toward mathematics, improved performance in mathematics courses, and increased enrollment in math classes represent the dimensions on which the success of the program is determined.

Teachers indicate that important outcomes of the program include: teachers' increased competence in math instruction and their heightened awareness of and increased sensitivity toward student problems in math learning, and parent and community recognition of the contributions made by the program.

Funding is provided by local, state, and federal sources.

Student progress is monitored by standardized mathematics tests.

CONTACT: Margaret M. Davis
Grenada Junior High School
Jones Road
Grenada, MS 38901
(601) 226-5135

21. Advanced Mathematics—College Preparatory

SITE: Booneville High School, Booneville, Mississippi

CONTENT FOCUS: Algebra, Geometry, Advanced Math, Precalculus, and Calculus

GRADE LEVEL: 8-12

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: The ***Advanced Mathematics-College Preparatory*** program emphasizes problem solving across algebra, geometry, and calculus courses for college-bound students.

The instructional design includes lectures, demonstrations, and extensive practice. Teachers who are successful in implementing this program have advanced mathematics training, at least three years of teaching experience, and a willingness to work outside of class to meet the needs of students.

The effectiveness of the program is judged by students' achievement in mathematics courses. Attitudes are expected to improve as achievement increases.

Participating teachers have become more competent in teaching math and more knowledgeable of math concepts than they were before the program was implemented. They also are aware of and sensitive to student problems.

Funding is provided by the state.

Student progress is monitored by standardized tests (Stanford Achievement Test, ACT, and local and statewide testing programs).

CONTACT: Johnny Sweeney
Booneville High School
100 Fourth Street
Booneville, MS 38829
(601) 728-5445

22. Algebra I and Geometry

SITE: Pontotac High School, Pontotac, Mississippi

CONTENT FOCUS: Algebra I and Geometry

GRADE LEVEL: 9-10

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: Success in Algebra I and Geometry is important for students who plan to continue their study of mathematics through high school and college. Pontotac High School's program prepares

students for advanced study in mathematics. The courses emphasize problem solving and applications.

Students meet daily in their classes and are expected to spend at least 30 minutes each day completing homework assignments.

Lectures and demonstrations are used in these courses. Several years of experience in teaching secondary mathematics is a prerequisite for teachers who are involved in the program. Teachers use the concepts outlined by Madeline Hunter's "Program for Effective Teachers" to guide the instructional design.

Classes are videotaped once during the school year, and the videotape is reviewed by the teacher and principal. Teachers participate in peer observations and departmental meetings.

The success of the program is judged by students' improved performance in mathematics courses, teachers' increased effectiveness in teaching the courses, and students' increased enrollment in math courses. Junior and senior high school math teams compete in district and state math tournaments.

Parental involvement is evident. The methods used in these courses have received recognition from community and state organizations.

No special funding is provided.

Student progress is monitored by teacher-made tests and standardized tests (Stanford Achievement Test and BSAP).

CONTACT: Miriam Clark
Pontotac High School
North Main Street
Pontotac, MS 38863
(601) 489-1275

23. *Math Emphasis Month (January)*

SITE: Ford Elementary School, New Albany, Mississippi

CONTENT FOCUS: Elementary Mathematics

GRADE LEVEL: 2-4

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: Mastery of the basic math functions (addition, subtraction, and multiplication) is necessary for students to be successful in mathematics problem solving. ***Math Emphasis Month*** is designed to enhance the mastery of these skills. Tests measuring problem solving skills are administered during the month of January at Ford Elementary School.

To motivate students, contests among grades 2-4 are held. Speed tests are used to ensure mastery of the basic facts. Prizes are awarded to students and classroom units, and blue ribbons are given to children who score an average of 90 or above. The class at each grade level with the highest percentage of student blue ribbons receives a large blue medallion that is placed on the classroom door.

Drill and practice sessions using flash cards and math games typify the instructional design during this special month. Students in each participating class work in small and large groups whose sizes are determined by instructional needs of the students.

The program is successful. Students' attitudes toward mathematics and their achievement levels have improved. Teachers have become sensitive to problems associated with learning the basic facts, and parents have become involved with their children's performance in mathematics.

No special funding is provided.

Student progress is determined by performance in contests and on the Stanford Achievement Test and state achievement tests.

CONTACT: Elaine Eudy
Ford Elementary School
507 Oak Street
New Albany, MS 38652
(601) 534-9551

24. *Saxon's Method of Teaching Math*

SITE: Petal School District, Petal, Mississippi

CONTENT FOCUS: Middle Years Mathematics (including Algebra I)

GRADE LEVEL: 6-9

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: ***Saxon's Method of Teaching Math*** is used by the Petal School District to promote greater understanding of and appreciation for mathematics. The fundamentals of mathematics, coupled with much practice, are stressed and rewarded. In addition, this program emphasizes retention of facts and concepts, problem solving, and improvement of student attitudes toward math. New topics are introduced gradually, and concepts previously taught are repeatedly reviewed.

The instructional design of the program is similar across grade levels. In the Saxon approach, adequate instructional time is allocated to allow students to increase their understanding and improve their long-term retention of math concepts. A given concept is introduced briefly in one lesson, and reviewed in subsequent lessons.

No special training is needed by participating teachers.

The effectiveness of the program is determined by students' positive attitudes toward math, achievement in mathematics courses, and increased enrollment in math.

Special funding is provided from local sources.

Student progress is monitored by the California Achievement Test.

CONTACT: Mike Walters
Petal School District
P.O. Drawer 523
Petal, MS 39465
(601) 545-3002

25. *Shaw School District Chapter I, Remedial Mathematics*

SITE: McEvans Elementary and Shaw High School, Shaw, Mississippi

CONTENT FOCUS: Basic Skills Mathematics and State Curriculum

GRADE LEVEL: 3-8

ACHIEVEMENT LEVELS of Students: Remedial and Average

PROGRAM DESCRIPTION: The goals of the Shaw School District's remedial mathematics program are to help students develop problem-solving skills, increase self-esteem, and improve attitudes toward mathematics. To accomplish these goals, teachers use hands-on activities, drills, and technologies.

The program provides assistance to mathematics teachers, offering an alternative to classroom instruction. The laboratory approach uses duplicated materials, flash cards, games, workbooks, mathematics texts, computer programs, and multisensory learning materials to accomplish the goals of the program.

Participating teachers should be certified in the area in which they are teaching; have prior teaching experience or knowledge of computer science; and possess an understanding of remedial programs. The program's success depends on participating teachers' communication with other classroom teachers.

Students meet daily and are expected to spend approximately five hours per week outside of the classroom completing program-related activities. The instructional design of the program includes brief lectures, demonstrations, modeling, peer tutoring, computer-assisted tutorials, individualized instruction, and computer instruction.

Measures of program's success include students' improved attitudes toward mathematics, increased self-esteem, and decreased enrollment in the program as a result of their returning to regular mathematics classes.

Funding is provided by state and federal sources.

Student progress is monitored by standardized achievement tests, by their ability to function consistently at or above grade level from year to year, and the completion rate of those who test out of the program and return to regular mathematics classes.

CONTACT: Clifton Courtney
Shaw High School
P.O. Box 510
Shaw, MS 38773
(601) 754-4651

North Carolina

26. *Competency Remediation in Mathematics*

SITE: Rocky Mount Senior High School, Rocky Mount, North Carolina

CONTENT FOCUS: General Mathematics

GRADE LEVEL: 10-12

ACHIEVEMENT LEVELS of Students: Remedial

PROGRAM DESCRIPTION: North Carolina has a mandatory competency-testing program. To receive a high school diploma, students must pass a competency test by the completion of 12th grade.

Competency Remediation in Mathematics was implemented to assist students in passing this competency exam. From a broader perspective, the program stresses the development of basic mathematics skills that are necessary for students to be productive in today's society.

Students meet daily in the program. They have access to computer-driven tutorials designed to provide instruction and practice. Students are expected to spend about 2.5 hours per week in activities outside of the formal setting of the program.

The instructional design of the program varies from group lectures to individualized teaching. Students are encouraged to work independently and with others to solve problems.

The effectiveness of the program is judged by students' achievement in school math courses and their scores on the NC Competency Test.

Funding is provided by the state.

Student progress is monitored by the North Carolina Competency Test.

CONTACT: Linda J. Tharin
Rocky Mount Senior High School
308 S. Tillery Street
Rocky Mount, NC 27801
(919) 937-6439

27. *Innovative Math-Science Program*

SITE: Southern Wayne Senior High School, Dudley, North Carolina

CONTENT FOCUS: Algebra I and Biology

GRADE LEVEL: 10-12

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: The ***Innovative Math-Science Program*** combines instruction in math and biology to encourage minority students to enter math- and science-related careers. The program provides experiences in mathematics and the sciences through field trips, hands-on activities, and microcomputer-based activities.

Apple IIe computers and interfacing equipment for microcomputer-based laboratories are used in the program.

Students meet once a week in the program and are expected to spend about three to four hours per week in activities outside of the classroom.

Science-Math learning center instruction emphasizes microcomputer-based laboratory activities and independent studies in math and science. Participating teachers should have several years of teaching experience and have attended computer science staff development sessions. Each week, teachers spend about five hours preparing and delivering instruction, two hours evaluating students, and two hours advising students.

Improved attitudes toward math and increased enrollment in mathematics courses by females and minorities are two dimensions by which the program has been deemed successful. Increasing the ability of teachers to integrate instruction in mathematics and science and strengthening their awareness of career opportunities in math and science are also important attributes of success.

Special funding is provided by the state.

Students' academic progress is monitored by locally prepared pretests and posttests and state tests in biology and Algebra I.

CONTACT: Doris Stokes or Peggy Kennedy
Southern Wayne Senior High School
Rte, 4, Box 55
Dudley, NC 28333
(919) 734-7196

28. *Introduction To College Mathematics*

SITE: North Carolina School of Science and Mathematics, Durham, North Carolina

CONTENT FOCUS: Advanced Mathematics-Fourth Year

GRADE LEVEL: 11-12

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: With a grant from the Carnegie Corporation of New York, the mathematics department of the North Carolina School of Science and Mathematics has developed materials and software for the fourth year of high school mathematics.

The course, ***Introduction to College Mathematics*** (ICM), lays the foundation for supporting future course work in mathematics, including calculus, finite mathematics, discrete mathematics, mathematical modeling, and statistics. The course also provides an introduction to mathematics as it is used in engineering, physical and life sciences, business and finance, and computer science. A primary goal of this course is to provide students with an applications oriented investigative mathematics course in which they are introduced to the technological world in which they live.

The course includes six sections: mathematical modeling; the computer and calculator as tools; applications of functions; data analysis; discrete phenomena; and numerical algorithms. Different instructional approaches are used. Computer-assisted instruction enables students to check their guesses and analyses, ask and answer questions, make conjectures, and work with real data.

The units in the course include: Geometric Probability; Data Analysis 1; Functions; Polynomial and Rational Functions; Algorithms 1; Exponential and Logarithmic Functions; Finance; Data Analysis 2; Model 1; Model 2; Trigonometric Functions and their Inverses; Applications of Trigonometry; Matrices; and Algorithm 2. Software packages developed for use with an IBM PC-compatible computer with 512K memory and a color graphics adapter are Functions, Analysis, Matrix, and Geometric Probability.

The National Council of Teachers of Mathematics is publishing *New Topics for Secondary School Mathe-*

matics, a four-book series of materials and software taken from six of the units of the ICM course. *Geometric Probability* and *Data Analysis* were released in the spring of 1988. Publication of *Matrices and Algorithms* will follow. The department offers summer workshops based on these materials and arranges presentations for interested school personnel during the year.

CONTACT: Helen Compton
North Carolina School of Science and Mathematics
P.O. Box 2418
Durham, NC 27705
(919) 286-3366

29. *Mathematics Demonstration Teacher/Resource Lab*

SITE: Scotland County Schools, Laurinburg, North Carolina

CONTENT FOCUS: Demonstrative Teaching

GRADE LEVEL: K-12

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***Mathematics Demonstration Teacher/Resource Lab*** offers teachers instructional guidance that demonstrates the importance of activity oriented instruction to the success of students in mathematics. The design includes activities that use manipulatives, critical-thinking and problem-solving techniques, and instructional computing integrated with manipulatives and problem-solving techniques. Program activities are implemented by a demonstration teacher. The demonstration teacher works with classroom teachers and models various types of instruction. In-service staff development for K-12 mathematics teachers is provided on an ongoing basis.

Knowledge and skills needed by a demonstration teacher include teaching experience at several grade levels; knowledge of current mathematics materials and techniques; knowledge of mathematics conferences and in-service programs at the local, state, and national levels; ability to use manipulatives and employ critical-thinking skills/problem-solving activities; interpersonal skills that encourage teachers to express their personal concerns about teaching math; and ability to act as a liaison to various schools and coordinator for countywide math activities.

Students' positive attitudes toward mathematics, increased participation and achievement in mathematics courses, and heightened career awareness are used to gauge the success of the Mathematics Demonstration/Resource Teacher Program. Participating teachers gain confidence in teaching and understanding math.

Teachers also become aware of and sensitive to the problems associated with mathematics learning.

Funding is provided from local sources.

Student progress is monitored by the California Achievement Test (CAT) in grades 1-7 and the state's End-of-Course Testing program in Algebra I and Algebra II at the secondary level.

CONTACT: Linda H. Sullivan
Scotland County Schools
233 East Church Street
Laurinburg, NC 28352
(919) 277-0005

30. *Model Mathematics and Science Program*

SITE: Maiden High School, Maiden, North Carolina

CONTENT FOCUS: High School Mathematics

GRADE LEVEL: 9-12

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: The teachers and parents of students at Maiden High School have developed a program designed to provide math students with a wide range of learning opportunities. Advanced placement calculus, computer programming, general math II, functional math I-IV, and advanced computer programming courses have been added to the curriculum.

An academic internship program allows students to work in careers of their choice. Members of a newly formed math club meet twice a month after school.

Incentives are provided to young scholars by the Academic Boosters' Club. The boosters' club recognizes a student of the month and a student of the year and also awards a $500 scholarship each year.

The instructional design of the program includes lectures and demonstrations.

Participating teachers should have training in teaching remedial math, computer science, and advance placement calculus.

The program has increased enrollment in math classes, improved performance in math classes, increased community involvement, and improved attitudes toward math.

Funding is provided by local and state sources.

Student progress is monitored by the state's End-of-Course Testing program and teacher-made evaluations.

CONTACT: Betty L. Paysour
Maiden High School
P.O. Box 277
Maiden, NC 28650
(704) 428-8197

31. *Preparing for Mathematics Competitions*

SITE: Chapel Hill High School, Chapel Hill, North Carolina

CONTENT FOCUS: Algebra, Geometry, Trigonometry, Number Theory, and Advanced Math

GRADE LEVEL: 11-12

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: Academic competition allows students to demonstrate their interest and skills in mathematics. ***Preparing for Mathematics Competitions*** provides students with knowledge of the competition process. The program helps students sharpen problem-solving skills, gain knowledge outside of the classroom, socialize with others with similar interests, and appreciate math.

Students meet once a week and are expected to spend time outside of class practicing their skills. Teachers spend about three to four hours each week preparing for program activities.

A variety of instructional activities help students prepare for competitions. Speakers are invited once each month; games are used to sharpen mathematical skills; and practice competitions are held. Although it is not required, supervising teachers of math competitions should have taught advanced mathematics courses.

The program is regarded as successful because of students' positive attitudes toward mathematics, their increased achievement levels in mathematics, and their improved performance in various competitions.

Teachers report that they enjoy getting to know students and are proud of student accomplishments. The program has received community and state recognition.

Local funding supports the program.

Student progress is monitored by results from competitions and scores from the mathematics section of the Stanford Achievement Test.

CONTACT: Burton W. Stuart, Jr.
Chapel Hill High School
High School Road
Chapel Hill, NC 27514
(919) 929-2106

32. *Technology and the Future: An Integrated Approach to Math and Science*

SITE: W. G. Enloe Magnet High School, Raleigh, North Carolina

CONTENT FOCUS: Geometry, Algebra, Logic, and Computers

GRADE LEVEL: 9-12

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: ***Technology and the Future*** integrates instruction in mathematics and science through the use of instructional technology. Special emphasis is placed on solving problems, investigating career choices, using and understanding technology, and developing analytical thinking.

Equipment required by the program includes elementary laboratory devices used for scientific experiments, computers, and a current set of scientific periodicals.

Students are expected to spend at least 2.5 hours per week completing homework assignments. In addition, they are responsible for developing community projects that involve the use of technology, allowing them to acquire first-hand information about the relationship of mathematics and science to future career opportunities.

Lectures, demonstrations, role playing, debates, cooperative learning, and laboratory experiences provide creative teaching approaches. Teachers who are successful with this program have experience in teaching problem-solving techniques and applications of math and technology.

The program has been successful in improving the attitudes of students toward mathematics and helping them to become interested in mathematics and science and aware of careers related to these areas.

Teachers report that their awareness of and sensitivity toward student problems have been enhanced. They have observed increased enrollment in math classes for minority and female students.

Special funding is provided by the GTE Corporation and local sources.

Student progress is monitored by attitude surveys, unit tests, and the success of community projects.

CONTACT: Liz Woolard
W. G. Enloe Magnet High School
226 Clarendon Crescent
Raleigh, NC 27604
(919) 7556870

South Carolina

33. Four-Year AP Math Program

SITE: Johnsonville High School, Johnsonville, South Carolina

CONTENT FOCUS: Calculus

GRADE LEVEL: 12

ACHIEVEMENT LEVELS of Students: Advanced

PROGRAM DESCRIPTION: The ***Four-Year Advanced Placement (AP) Math Program***, designed for advanced mathematics students, focuses on problem solving and calculus applications. It also has been effective with students who have not completed Algebra I prior to the ninth grade. Students also learn about career options related to the study of mathematics.

Students meet daily and are expected to spend about seven hours each week outside of class working on problems related to program activities.

Lectures, demonstrations, and cooperative learning instructional activities are used in the course. Participating teachers should have experience teaching all levels of college preparatory math, including geometry. Teachers spend about 12 hours each week preparing for and delivering instruction.

The effectiveness of the program is judged by students' improved attitudes toward mathematics, increased understanding of career opportunities, and improved scores on the AP Calculus exam.

Funding is provided by the local and state sources. Student progress is monitored by teacher-made tests and an advanced placement exam.

CONTACT: Marsha Carter
Johnsonville High School
Johnsonville, SC 29555
(803) 386-3830

34. LOGO in the Mathematics Classroom

SITE: Spartanburg County School District No. 7, Spartanburg, South Carolina

CONTENT FOCUS: Geometry

GRADE LEVEL: 3-6

ACHIEVEMENT LEVELS of Students: Remedial, Average, and Advanced

PROGRAM DESCRIPTION: ***LOGO in the Mathematics Classroom*** emphasizes effective use of LOGO and the computer as instructional tools for teaching and learning geometric concepts. Students usually work in pairs at computers, creating geometric shapes and designs. Instruction is provided by a teacher who is assisted by a computer lab assistant.

Students meet daily over a one- to two-week period. They are assigned homework activities that do not require the use of a computer.

To implement program activities successfully, teachers need locally developed units of instruction, computers, and LOGO language disks.

Teachers receive training in the use of LOGO language and the instructional units for teaching geometry at the elementary level.

Each unit of instruction requires approximately five hours of teacher preparation. Support staff provide about five hours of instruction and work about one hour completing administrative-related tasks for each class.

In addition to improved students' attitudes toward mathematics and their increased understanding of geometry, the effectiveness of the program is measured by increased awareness by students and teachers of computers as tools for learning.

Funding is provided by the local school board.

Student progress is monitored by the results from the geometry section of the South Carolina Basic Skills Assessment Program.

CONTACT: Carol Ellis
Spartanburg County School District
P.O. Box 970
Spartanburg, SC 29304
(803) 594-4400

35. Mathematics Their Way: Supplemental Mathematics Program

SITE: Dorchester School District 2, Summerville, South Carolina

CONTENT FOCUS: K-6 Mathematics

GRADE LEVEL: K-6

ACHIEVEMENT LEVELS of Students: Remedial, Average, Advanced, and Handicapped

PROGRAM DESCRIPTION: ***Mathematics Their Way***, which has gained wide acceptance over the past five years, uses the basal program in kindergarten and supplements the adopted text in grades 1-2. A follow-up program called Mathematics, A Way of Thinking, is used in grades 3-6.

The program emphasizes concept development and improvement of students' attitudes toward mathematics. Hands-on strategies are used to teach the con-

cepts of numbering, patterning, estimating, graphing, and problem solving. The concepts are taught at the concrete level of cognitive development and accommodate students with a wide range of abilities. Class activities revolve around the use of manipulatives, including commercial and noncommercial materials such as unifix cubes, pattern blocks, buttons, caps, rocks, and keys. Teachers use demonstrations, cooperative learning techniques, and self-directed small group activities to achieve program goals. Activities are designed to move students from the concept level to the connecting level and then to the abstract level of understanding.

Participating teachers are required to have experience in early childhood education and training in the use of the *Mathematics Their Way* resource guide. Teachers spend one to two hours per week preparing for class and instructing. Teacher assistants contribute one to two hours per week.

Funding is provided by local and state funds.

Students' attitudes toward mathematics have improved as have their achievement levels in mathematics. Teachers are more competent and more knowledgeable of mathematics than they were before the program was implemented. They have become sensitive to problems associated with understanding mathematics.

CONTACT: Betty C. Boseman
Dorchester School District 2
102 Greenwave Blvd.
Summerville, SC 29483
(803) 873-2901

36. Math Lab I and Math Lab II

SITE: The School District of Greenville County, Greenville, South Carolina

CONTENT FOCUS: Remedial Mathematics

GRADE LEVEL: 9-10

ACHIEVEMENT LEVELS of Students: Remedial

PROGRAM DESCRIPTION: ***Math Labs I and II*** emphasize a comprehensive approach to learning mathematics that addresses mathematical concepts, operations, geometry measurements, and problem solving. The primary objective of the program is to prepare students for vocational education through the application of basic skills. In addition, a dropout prevention element of the program is directed toward at risk students.

Students attend class daily. They must be enrolled in a prevocational or vocational course before they are allowed to participate in laboratory activities. The instructional equipment used by students includes computers, calculators, Dukane projectors, metric and customary measuring instruments, and a variety of manipulative materials.

Program effectiveness has resulted in improved student attitudes toward mathematics, increased achievement in mathematics courses, heightened awareness of mathematics careers, and increased enrollment of minorities and females in higher order mathematics classes. Students also are better prepared for vocational programs than they were before the program started.

Teachers have enhanced their ability to teach mathematics, added to their knowledge of mathematics, become aware of and sensitive toward student problems in learning mathematics, and gained experience teaching in a laboratory environment.

Funding is provided by local and state sources.

Student progress is monitored by the Metropolitan Achievement Survey Test for diagnosis, locally developed tests, and CTBS and BSAP for end-of-year assessments.

CONTACT: Eloise L. Rudy
Mathematics Consultant
The School District of
Greenville County
P.O. Box 2848
Greenville, SC 29602
(803) 242-6450 ext. 345

37. SAT-Mathematics Improvement Project

SITE: South Carolina Department of Education, Columbia, South Carolina

CONTENT FOCUS: 7-8 Grade Math, Geometry, and Algebra

GRADE LEVEL: 7-12

ACHIEVEMENT LEVELS of Students: Average and Advanced

PROGRAM DESCRIPTION: The ***SAT-Mathematics Improvement Project*** is designed to help students improve their performance on the PSAT and the SAT. The program stresses problem solving, higher level thinking skills, and test-taking strategies. Schools throughout the state participate in the program. Each school determines the particular characteristics of the program at its site.

Students meet regularly in the program. In some schools, sessions are held daily, and in others they are held once a week or once a month. The program can be implemented in different settings—in regularly scheduled math classes or in SAT preparation classes.

Students are encouraged to study outside of the formal setting.

Materials used in providing instruction to students include the SAT-Mathematics Improvement Project materials, general information for teachers, PSAT pretests and posttests, diagnostic tests, student practice booklets of SAT items, a sourcebook for teaching problem solving, and teacher card files of SAT items.

The program uses individual and group practice sessions with problem solving and SAT mathematics items appropriate to classroom instruction. Teachers in the program should participate in a one-day SAT-Mathematics Improvement Project training workshop.

Success of the program is measured by students' improved attitudes toward mathematics, increased levels of achievement in high school mathematics courses, and improved SAT-M scores.

Teachers report that they have become more aware of and sensitive toward problems associated with test taking.

Funding is provided by state, regional, and federal sources.

Student progress is monitored by performance on released PSATs and SATs.

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38. Solving The Problem of Mathematics Problem Solving

SITE: A Teleworkshop for Teachers, South Carolina Department of Education, Columbia, South Carolina

CONTENT FOCUS: Teacher Training in Mathematics

GRADE LEVEL: 7-12

TEACHER INVOLVEMENT: For all teachers; especially for teachers of college preparatory mathematics

PROGRAM DESCRIPTION: ***Solving the Problem of Mathematics Problem Solving*** serves students by enhancing teachers' problem-solving abilities and by providing them with effective instructional techniques for teaching problem solving.

The instructional concept revolves around a two-hour teleworkshop (video cassette and worksheets). A trained facilitator assists with staff development. No special training is needed in advance by the participating teachers, but the facilitator for the teleworkshop must receive special training.

Teachers meet once in the program. Time devoted to problem-solving activities following the teleworkshop varies. Written materials are provided to assist teachers in understanding and teaching problem solving.

The program helps teachers enhance their competence in solving mathematical problems and gain confidence in their ability to teach problem solving.

Funding is provided by the state.

Student progress is monitored by the SAT-Mathematics.

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